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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Application Number: 10/711,308
Filing Date: September 09, 2004
Appellant(s): NICCUM ET AL.

____
Robb D. Edmonds
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 2 March 2009 appealing from the Office Action mailed 24 July 2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. However, Examiner notes that grounds "A" and "B," addressed by Appellant as *separate* grounds for rejection, were actually applied by Examiner as ***alternative*** grounds for rejection. In this regard, Examiner notes that the alternative

grounds for rejection listed at paragraph 8 of the Office Action (final rejection) mailed 24 July 2008 inadvertently excluded claims 25 and 28-33. However, the record in nevertheless clear that these claims were treated on the merits and that the secondary references were merely cited to reinforce the teachings of the primary reference and/or as evidence of what is already known in the art.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

US 4,692,311	PARKER et al.	09-1987
US 7,108,138	SIMPSON	09-2006
US 5,869,008	DEWITZ	02-1999
US 5,843,377	FANDEL et al.	12-1998
US 6,041,754	MORI et al.	03-2000
US 2005/0016178	WASIF et al.	01-2005
US 2005/0183664	HWANG et al.	08-2005

N.W.M. Ko & A.S.K. Chan, *In the Intermixing Region Behind Circular Cylinders With Stepwise Change of the Diameter*, 9 EXPERIMENTS IN FLUIDS 213-221(1990)

(9) Grounds of Rejection

The following grounds of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 5, 6, 21-25, 26, and 27-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parker (US 4,692,311). Alternatively, claims 1, 5, 6, 21-24, 26, and 27 are rejected under 35 U.S.C. 103(a) over Parker (US 4,692,311) in view of Simpson (US 7,108,138) and as further evidenced by Dewitz (US 5,869,008) or Ko (N.W.M. Ko & A.S.K. Chan, *In the Intermixing Region Behind Circular Cylinders With Stepwise Change of the Diameter*, 9 EXPERIMENTS IN FLUIDS 213-221(1990)) or Mori (US 6,041,754) or Wasif (US 2005/0016178) or Hwang (US 2005/0183664).

5. With respect to claim 1, Parker discloses a particulate stripping unit (Fig. 2) for separating particles in suspension with a carrier fluid with a self-stripping disengagement feature, comprising: (a) a vessel (17) having a cyclone section (24) and a stripping section (27); (b) an inlet (31) to tangentially feed a particulate-fluid suspension to the cyclone section (24); (c) a cylindrical surface within the cyclone section (24) to separate a major fraction of the particulates from the suspension and form a central fluid vortex of reduced particulate content; (d) a particulate discharge outlet (39) from the cyclone section (24) to the stripping section (27); (e) a plurality of apertures disposed through a lower portion of the stripping section (see Parker, Fig. 2; and column 6, lines 22-24); and (f) a discharge line (20) from the cyclone section (24) in communication with the vortex.

Parker does not disclose wherein the particulate stripping unit comprises a stripping section having a cross sectional area less than a cross sectional area of the cyclone section.

However, it is known to those in the art that changes in diameter of a conduit through which fluid flows will induce a vortex to form therein.[1] For example, Simpson discloses a material classifier device that uses an internal cyclone to separate coarse particles from fine particles (see Simpson, Abstract). Simpson instructs that "in order to enhance and aid the interior vortex development, one needs to introduce diffuser air at a cylinder diameter larger than the cyclone outlet diameter" (see Simpson, column 6, lines 12-24). Examiner further notes that Simpson discloses wherein his cyclone material classifier uses "a plurality of openings disposed through a lower portion of the stripping section" (see Simpson, column 6, lines 12-24) which he again cites as important to aid in the formation and sustainability of the interior vortex.

Therefore, the person having ordinary skill in the art of particulate stripping units would have been motivated to modify the unit of Parker by increasing the cross sectional area of the cyclone section relative to the stripping section (as is known in the art and further evidenced by Simpson) in order to ensure rapid development and sustained strength of an interior vortex necessary to separate particulates from the carrier fluid.

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[1] See generally, N.W.M. Ko & A.S.K. Chan, *In the Intermixing Region Behind Circular Cylinders With Stepwise Change of the Diameter*, 9 EXPERIMENTS IN FLUIDS 213-221(1990). See also Mori (US 6,041,754) (column 1, lines 39-43) ("Similarly, if there is a step difference where the passageway diameter expands in the direction of advance of intake air in the idle intake passageway [ ] downstream of the idle intake regulation valve [ ], a vortex is generated downstream of the step."); Wasif (US 2005/0016178) (page 2, paragraph 23) ("The flat geometry of the burner insert assembly [ ] provides an abrupt diameter change from the outlet end of the main burner [ ] to the combustion chamber [ ], which causes a flow vortex [ ] just downstream of the burner insert assembly [ ] within the combustion chamber."); and Hwang (US 2005/0183664) (page 1, paragraph 12) ("The vortex of the process gas G is generated due to the above-mentioned abrupt diameter difference.").

Finally, the person having ordinary skill in the art of particulate stripping units would have had a reasonable expectation of success in modifying the unit of Parker as taught by Simpson because: (1) both Parker and Simpson are concerned with the cyclonic removal of particulate matter from a carrier fluid; and (2) Parker's unit is not specifically limited to the embodiment shown in his Fig. 2.

6. With respect to claim 5, Parker discloses wherein the particulate stripping unit (17) further comprises a stabilizer (26) disposed between the vortex (in the cyclone zone (24)) and the stripping section (27), the stabilizer (26) comprising an annular passage disposed therethrough.

7. With respect to claim 6, Parker discloses wherein the particulate stripping unit inlet (31) is connected to a riser reactor (see Parker, column 1, lines 14-19; and column 2, lines 44-49).

8. With respect to claim 21, Parker discloses a method for stripping vapor from a suspension in a carrier gas, comprising: (a) separating particulates from the suspension in a separation zone having a first-cross-sectional area to form a particulate-rich stream with entrained vapor and a vapor stream lean in suspended matter; (b) introducing a stripping fluid through a plurality of apertures formed through a lower exterior wall of a stripping zone below the initial separation zone; (c) passing the particulate-rich stream from the separation zone through the stripping zone, making countercurrent contact with the stripping fluid to remove at least a portion of the entrained vapor, and into a dipleg in communication with the stripping zone; and (d)

recovering stripped particulates from the dipleg (see Parker, Fig. 2; column 2, lines 35-68; and column 3, lines 1-10).

Parker does not disclose wherein the stripping zone has a second cross-sectional area less than the first cross-sectional area of the separation zone.

However, it is known to those in the art that changes in diameter of a conduit through which fluid flows will induce a vortex to form therein. For example, Simpson discloses a material classifier device which uses an internal cyclone to separate coarse particles from fine particles (see Simpson, Abstract). Simpson instructs that “in order to enhance and aid the interior vortex development, one needs to introduce diffuser air at a cylinder diameter larger than the cyclone outlet diameter” (see Simpson, column 6, lines 12-24). Examiner further notes that Simpson discloses wherein his cyclone material classifier uses “a plurality of openings disposed through a lower portion of the stripping section” (see Simpson, column 6, lines 12-24) which he again cites as important to aid in the formation and sustainability of the interior vortex.

Therefore, the person having ordinary skill in the art of particulate stripping units would have been motivated to modify the unit of Parker by increasing the cross sectional area of the cyclone section relative to the stripping section (as is known in the art and further evidenced by Simpson) in order to ensure rapid development and sustained strength of an interior vortex necessary to separate particulates from the carrier fluid.

Finally, the person having ordinary skill in the art of particulate stripping units would have had a reasonable expectation of success in modifying the unit of Parker as

taught by Simpson because: (1) both Parker and Simpson are concerned with the cyclonic removal of particulate matter from a carrier fluid; and (2) Parker's unit is not specifically limited to the embodiment shown in his Fig. 2.

9. With respect to claim 22, Parker discloses wherein the stripping zone is in fluid communication with the initial separation zone via an annular passage defined by an outside diameter of a stabilizer (26) and an interior wall of the stripping zone (27) (see Parker, Fig. 2 and accompanying text).

10. With respect to claims 23 and 24, Parker discloses a cyclone having a stripping zone (27) in communication with the upper portion (cyclone zone (24)), wherein the cyclone bottom includes a dipleg (23) to receive the solids rich stream from the stripping zone and a plurality of openings (see Parker, Fig. 2) in the wall of the cyclone bottom to introduce stripping fluid into the stripping zone; and wherein the new cyclone bottom comprises a vortex stabilizer (26) and an interior wall of the cyclone bottom that defines an annular passage (39) there between.

Parker does not disclose wherein such cyclone apparatus is made by retrofitting an existing cyclone.

However, Parker specifically notes the advantages provided by his cyclone design. He explains that prior attempts to introduce stripping gas directly into a cyclone separator resulted in a loss of separation efficiency, and thus was impractical (see Parker, column 2, lines 22-24). This problem was overcome by Parker's design through the addition of the vortex stabilizing means (26). Thus, the vortex stabilizer (26) allows for the *unitary* design of Parker's cyclone separator/stripper, providing (1) quick stripping

time to remove bulk product vapor and interstitial vapor, and (2) longer stripping time required to desorb hydrocarbon products from the catalyst (see Parker, column 2, lines 14-35). Examiner finds that following the steps of Applicant's "method of retrofitting an existing cyclone to a self-stripping cyclone" as defined by claims 23 and 24 would result in the unitary design of Parker's cyclone separator/stripper as modified in view of Simpson (see discussion *supra* at paragraph 5). Moreover, it is generally known in the art to retrofit existing cyclones, e.g. in order to make use of existing process equipment and to save on new equipment costs (see e.g., Dewitz (US 5869008) at column 9, lines 19-46).

Therefore, it would have been obvious to the person having ordinary skill in the art at the time the invention was made to retrofit an existing cyclone to a self-stripping cyclone of the type disclosed by Parker by installing a new cyclone bottom to an upper portion of the existing cyclone in order to provide a stripping zone in communication with the upper portion, wherein the cyclone bottom includes a dipleg to receive the solids rich stream from the stripping zone and a plurality of openings in the wall of the cyclone bottom to introduce stripping fluid into the stripping zone; and wherein the new cyclone bottom comprises a vortex stabilizer and an interior wall of the cyclone bottom that defines an annular passage there between.

11. With respect to claim 25, see discussion *supra* at paragraph 5. Examiner notes that the sintered ring (34) of Parker would necessarily contain "a plurality of unobstructed openings formed therethrough" in order to allow for diffusion of the ammonia and air up through the lower portion of Parker's device. Examiner notes that if

the sintered ring (34) of Parker did not contain such "plurality of unobstructed openings formed therethrough," then the device of Parker would be rendered completely inoperable.

12. With respect to claim 27, the person having ordinary skill in the art would recognize that the apparatus of Parker as modified to incorporate a change in diameter would *necessarily* have a tapered transition section disposed between the upper section and the lower section. Moreover, Simpson discloses wherein a tapered transition section is disposed between the upper section and the lower section of an apparatus for separating particulates from a carrier fluid (see Simpson, Fig. 2 and Fig. 5).

13. With respect to claim 28, Parker discloses wherein the conical member (25, 26) comprises an apex (25) disposed toward the upper section (24) and a base (26) defining one or more passages with an inner wall of the lower section (27, 35).

14. With respect to claim 29, see discussion *supra* at paragraphs 8 and 11.

15. With respect to claims 30 and 32, Parker discloses wherein the stripping fluid velocity will depend on catalyst circulation rate and cyclone (i.e. catalyst bed) cross sectional area (see Parker, column 6, lines 64-66). In addition, Parker provides the results from a pilot scale study in which he relates catalyst flow rate to stripping fluid rate (see Parker, Table 1) and provides comparison to commercial-scale operations (see Parker, column 6, lines 66-68; and column 7, lines 1-6). In this regard, the court has instructed that the mere scaling up of a prior art process capable of being scaled up does not establish patentability in a claim to an old process so scaled. *See In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976).

Therefore, it would have been obvious to the person having ordinary skill in the art at the time the invention was made to scale the apparatus and process of Parker in order to provide an average solids flux rate of from 24 to 440 kg per square meter of cross-sectional area per second, and stripping fluid at an average fluid velocity of from 9 to 90 meters per second.

16. With respect to claim 31, Parker discloses wherein the method includes passing fluid up through the annular passage at a superficial velocity range of 0.1 to 5 meters per second (see Parker, column 6, lines 66-68).

17. With respect to claim 33, Parker discloses wherein the particulate-fluid suspension is a fluidized catalytic cracker riser stream containing hydrocarbon gas and particulates (see Parker, Abstract; and column 1, lines 10-19).

18. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Parker (US 4,692,311) in view of Fandel (US 5,843,377). Alternatively, claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Parker (US 4,692,311) in view of Simpson (US 7,108,138) and Fandel (US 5,843,377).

19. With respect to claim 4, Parker discloses a particulate stripping unit (Fig. 2) for separating particles in suspension with a carrier fluid with a self-stripping disengagement feature, comprising: (a) a vessel (17) having a cyclone section (24) and a stripping section (27); (b) an inlet (31) to tangentially feed a particulate-fluid suspension to the cyclone section (24); (c) a cylindrical surface within the cyclone section (24) to separate a major fraction of the particulates from the suspension and form a central fluid vortex of reduced particulate content; (d) a particulate discharge

outlet (39) from the cyclone section (24) to the stripping section (27); (e) a plurality of apertures disposed through a lower portion of the stripping section (see Parker, Fig. 2; and column 6, lines 22-24); and (f) a discharge line (20) from the cyclone section (24) in communication with the vortex.

Parker does not disclose wherein the particulate stripping unit comprises (1) a stripping section having a cross sectional area less than a cross sectional area of the cyclone section; or (2) a thermal expansion joint disposed on the discharge line from the cyclone section.

However, it is known to those in the art that changes in diameter of a conduit through which fluid flows will induce a vortex to form therein. For example, Simpson discloses a material classifier device which uses an internal cyclone to separate coarse particles from fine particles (see Simpson, Abstract). Simpson instructs that "in order to enhance and aid the interior vortex development, one needs to introduce diffuser air at a cylinder diameter larger than the cyclone outlet diameter" (see Simpson, column 6, lines 12-24). Examiner further notes that Simpson discloses wherein his cyclone material classifier uses "a plurality of openings disposed through a lower portion of the stripping section" (see Simpson, column 6, lines 12-24) which he again cites as important to aid in the formation and sustainability of the interior vortex. In addition, Fandel discloses an FCC separation system that uses a gas collection conduit that incorporates an expansion element for accommodating differential growth between different subunits of the FCC separation system (see Fandel, Abstract). Fandel explains that the expansion elements (e.g. thermal expansion joints) are provided to

relieve stresses associated with differential expansions occurring as a result of changes in process temperature (e.g. during process start-up and shut-down). Thus, such expansion elements are provided as a means to eliminate rigid connections between subunits of the FCC system, and allow for positional changes of the process equipment in relation to changes in process temperature that would otherwise cause damage to the equipment as a result of thermal stress or fatigue failure (see Fandel, column 2, lines 11-19; column 3, lines 2-4 and 62-67; and column 4, lines 1-13).

Therefore, the person having ordinary skill in the art of particulate stripping units would have been motivated to (1) modify the unit of Parker by increasing the cross sectional area of the cyclone section relative to the stripping section (as is known in the art and further evidenced by Simpson) in order to ensure rapid development and sustained strength of an interior vortex necessary to separate particulates from the carrier fluid; and (2) incorporate the thermal expansion joints of Fandel into the particulate stripping unit of Parker in order to prevent equipment failure brought about by thermal expansion of the unit connections.

Finally, the person having ordinary skill in the art of particulate stripping units would have had a reasonable expectation of success in modifying the unit of Parker as taught by Simpson and Fandel because: (1) Parker, Simpson, and Fandel are all concerned with the cyclonic removal of particulate matter from a carrier fluid; and (2) Parker’s unit is not specifically limited to the embodiment shown in his Fig. 2.

(10) Response to Argument

<u>Appellant's argument on page 12</u>

Appellant argues at page 12 of the brief that Examiner's rejection is "clearly erroneous" because Parker does not teach, show, or suggest all the limitations of any pending claim.

In response to Appellant's argument, Examiner notes that the rejection of the claims over Parker alone was in the context of *what is already known in the prior art* – namely, the general engineering principle that changes in the diameter of a conduit through which fluid flows will induce a vortex to form therein. In this regard, Examiner notes that obviousness exists where the claims at issue cover no more than an obvious solution to a known problem. See *KSR Int'l Co. v. Teleflex Inc.*, 82 USPQ.2d 1385, 1397 (U.S. 2007). Thus, the person having ordinary skill in the art would recognize that modifying the cyclone of Parker to provide for the injection of air in a stripping section (27) having a smaller cross-sectional area than a cyclone section (24) would necessarily induce or otherwise strengthen a vortex formed therein owing to the differences in diameter between the stripping section (27) and the cyclone section (24) (of the modified cyclone). Furthermore, the person having ordinary skill in the art would have been motivated to make such modification of Parker's cyclone because Parker explains that strength of the vortex plays a critical role in determining separation efficiency and erosion resistance of the cyclone (see Simpson, column 3, lines 37-40).

Finally, Examiner notes that such a cyclone design (i.e. with the separator having a stripping section that is smaller in cross-sectional area than a cyclone section) is

standard (or *conventional*) in the art of cyclonic separators (see e.g., Simpson, column 5, lines 5-13) (*"This cyclone geometry well known in the art creates a circular flow around the exterior portion of cyclone housing 101 . . ."*) (emphasis added). See also Fandel (US 5,843,377) (Fig. 1, cyclone (30); Fig. 2, cyclone (100); and Fig. 3, cyclone (136)) (all showing cyclone with inwardly converging bottom portion); and Dewitz (US 5,869,008) (Fig. 1, cyclone (30); and Fig. 3, cyclone (30)) (all showing cyclone with inwardly converging bottom portion).

Appellant's argument on page 13

Appellant argues at page 13 of the brief that it is well known and widely recognized that sintered metal rings are solid structures that do not have "apertures" or "unobstructed openings," as those terms are known and used in the art.

In response to Appellant's argument, Examiner agrees that a sintered metal ring is a "solid" inasmuch as it is not a "liquid" or a "gas." However, sintered metals are *porous*, i.e. containing *many* "apertures" or "openings." Examiner notes that Appellant has not provided any specific definition for "aperture" or "opening" in Applicant's specification. In addition, Examiner does not consider "aperture" or "opening" to be terms of art having any special meaning other than that ordinarily used in the English language. In such instance, simple English words whose meaning is clear and unquestionable, absent any indication that their use in a particular context changes their meaning, are construed to mean exactly what they say. See MPEP § 2111.01 (citing *Chef America, Inc. v. Lamb-Weston, Inc.*, 358 F.3d 1371 (Fed. Cir. 2004)).

With respect to Appellant's remarks regarding Parker's sintered metal ring being a "solid" structure having no "apertures" or "unobstructed openings," Examiner notes wherein Parker discloses (at column 6, lines 22-26): *"Air and ammonia or water were injected through an annular plenum 33 and a sintered stainless steel ring into the bottom of the catalyst bed 35"* (emphases added) (see Parker, Fig. 2 with accompanying text). Thus, if Appellant's argument (that the sintered metal ring of Parker is a *solid* structure having no "unobstructed openings") were accepted as true, then Parker's stripper cyclone would be *completely inoperable* as there would be no means by which the injected air and ammonia could pass through the annular plenum (33) and into the catalyst bed (35).

Appellant's arguments on pages 15-17

Appellant argues at pages 15-17 of the brief that: (1) a combination of Parker in view of Simpson and as further evidenced by Ko, Mori, Wasif, or Hwang, "teaches away" from the claimed invention; (2) Simpson has nothing to do with stripping particulates, nor anything to do with separating particulates from a gas; (3) Simpson suggests modifying Parker to make its stripping zone larger than its cyclone zone; and (4) Simpson suggests modifying Parker to include a strong vortex which is exactly what Parker is trying to avoid and teaches against.

In response to Appellant's "teaching away" argument, Examiner submits that Parker and Simpson are entirely consistent and there is nothing in the cited references that would presumably "teach away" from Examiner's combination of these references.

In response to Appellant's argument regarding Simpson's field of invention, Examiner notes that *both* Parker and Simpson are directed to cyclone separators. The fact that Simpson does not treat the identical type feed as Parker is irrelevant. As the court has instructed: "[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill." *KSR Int'l Co. v. Teleflex Inc.*, 82 USPQ.2d 1385, 1396 (U.S. 2007).

In response to Appellant's argument regarding Simpson's alleged suggestion to modify Parker to make its stripping zone larger than its cyclone zone, Examiner notes that Appellant cites Simpson (column 6, lines 16-19) for support of such argument. That portion of Simpson provides: "It has been found that in order to enhance and aid the interior vortex 702 development, one needs to introduce diffuser air 304 at a cylinder diameter 342 which is larger than the cyclone outlet diameter 103." However, there is nothing inconsistent with the cited portion of Simpson and Appellant's claim limitation for providing a stripping section having a cross-sectional area less than a cross-sectional area of a cyclone section. Indeed, the illustrated design of Simpson's own device meets this limitation (see Simpson, Fig. 2) (showing upper portion of the cyclone housing (101) (cyclone section) having a *larger* cross-sectional area than a lower portion (stripping section) of the cyclone housing (101) near cyclone outlet (103)). Moreover, Examiner notes that such design (i.e. with the separator having a stripping section that is smaller in cross-sectional area than a cyclone section) is *standard* (or *conventional*) in the art of cyclonic separators (see e.g., Simpson, column 5, lines 5-13) (*"This cyclone geometry*

well known in the art creates a circular flow around the exterior portion of cyclone housing 101 . . .") (emphasis added). See also Fandel (US 5,843,377) (Fig. 1, cyclone (30); Fig. 2, cyclone (100); and Fig. 3, cyclone (136)) (all showing cyclone with inwardly converging bottom portion); and Dewitz (US 5,869,008) (Fig. 1, cyclone (30); and Fig. 3, cyclone (30)) (all showing cyclone with inwardly converging bottom portion).

In response to Appellant's argument regarding Parker's allegedly wanting to avoid a strong vortex, Examiner notes wherein Parker explicitly teaches that "[t]he strength and stability of the vortex are of primary importance in determining both separation efficiency and erosion resistance of a cyclone" (see Parker, column 3, lines 37-40). There is otherwise nothing in Parker that would seemingly teach or suggest wanting to "avoid" a strong vortex. Indeed, creation of a vortex is *critical* to the operation of Parker's device. In this regard, Examiner notes that Appellant's arguments are seemingly premised on Parker's use of a vortex "stabilizer" (26) to prevent "unacceptable catalyst carryover" (see Appellant's brief at pages 16 and 17). However, such argument is moot and irrelevant inasmuch as Examiner's proposed modification of Parker does not remove the vortex stabilizer therein, but only modifies the cylone section (24) to have a larger cross-sectional area than the stripping section (27). Thus, modifying Parker's cyclone to conform to other designs conventional in the art or as otherwise suggested by Simpson to create a strong[er] vortex therein would *not* render Parker's device inoperable for its intended purpose since the vortex stabilizer would remain in the modified cyclone of Parker, thereby continuing to prevent "unacceptable

catalyst carryover." Finally, Examiner notes that vortex "stabilization" is ***not*** the same as vortex "mitigation."

Appellant's arguments on pages 17 and 18

Appellant argues at pages 17 and 18 of the brief that: (1) it is clear that Parker teaches away from creating an interior vortex as taught by Simpson due to the mere presence of the stabilizer; (2) Examiner's proposed modifications to Parker would lead to an enhancement of an interior vortex, which would cause the smaller particulates of Parker to exit with the clean gas through the overhead outlet 20 at the top of the stripper cyclone 17, rather than through the catalyst outlet 23, at the bottom of the stripper cyclone 17; (3) Parker has no interest in classifying particulates and no interest in an interior vortex; and (4) Simpson as further evidenced by Ko, Mori, Wasif, and Hwang, suggest modifying Parker to include a strong interior vortex, which would render Parker unsuitable for its intended purpose because such a strong or enhanced interior vortex would cause unacceptable catalyst carryover.

In response to Appellant's arguments, Examiner notes wherein Parker explicitly teaches that "[t]he strength and stability of the vortex are of primary importance in determining both separation efficiency and erosion resistance of a cyclone" (see Parker, column 3, lines 37-40). Indeed, creation of a vortex is *critical* to the operation of Parker's device. In this regard, Examiner notes that Appellant's arguments are seemingly premised on Parker's use of a vortex "stabilizer" (26) to prevent "unacceptable catalyst carryover" (see Appellant's brief at pages 16 and 17). However,

such argument is moot and irrelevant inasmuch as Examiner's proposed modification of Parker does not remove the vortex stabilizer therein, but only modifies the cylone section (24) to have a larger cross-sectional area than the stripping section (27). Thus, modifying Parker's cyclone to conform to other designs conventional in the art or as otherwise suggested by Simpson to create a strong[er] vortex therein would *not* render Parker's device inoperable for its intended purpose since the vortex stabilizer would remain in the modified cyclone of Parker, thereby continuing to prevent "unacceptable catalyst carryover." Finally, Examiner notes that vortex "stabilization" is *not* the same as vortex "mitigation."

Appellant's argument on page 18

Appellant argues at page 18 of the brief that: (1) Simpson is non-analogous art; and (2) Simpson is in a "completely different field" from both Parker and the claimed invention.

In response to Appellant's argument, Examiner notes that *both* Parker and Simpson are directed to cyclone separators. The fact that Simpson does not treat the identical type feed as Parker is irrelevant. As the court has instructed: "[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill." *KSR Int'l Co. v. Teleflex Inc.*, 82 USPQ.2d 1385, 1396 (U.S. 2007).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Randy P. Boyer

/Randy P. Boyer/

Conferees:

Glenn A. Caldarola

/Glenn A Caldarola/

Acting SPE of Art Unit 1797

/Jennifer Michener/

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QAS, TC1700